AMENDMENTS TO THE CLAIMS:

Claims 1-25 (Cancelled)

Claim 26. (New) A gas sensor of the type having a housing defining a chamber within which light is transmitted from a source to a detector through an optical path within the chamber,
comprising:

- a source arranged to provide light to a detector through an optical path;

- at least two reflective surfaces of part ellipsoidal shape arranged to reflect light from the source to the detector through the optical path;

- wherein the detector is arranged to detect light only from a predetermined directional range, and wherein the optical source is arranged to emit light in a predetermined directional range, such that only light transmitted through the optical path via the at least two reflective surfaces is detected by the detector.

Claim 27. (New) A gas sensor according to claim 26, wherein the sensor includes an optical element to select a range of angles of acceptance.

Claim 28. (New) A gas sensor according to claim 27, wherein the optical element comprises an immersion lens.

Claim 29. (New) A gas sensor according to claim 26, further comprising at least a first planar surface arranged within the optical path so as to reflect light from one of the two surfaces of part ellipsoidal shape to the other.

Claim 30. (New) A gas sensor according to claim 29, further comprising a second surface with at least two reflective regions arranged within the optical path to reflect light between the reflective surfaces of part ellipsoidal shape and the first planar surface.

Claim 31. (New) A sensor as claimed in claim 26, wherein the predetermined directional range of the detector or source comprises a predetermined solid angle.

Claim 32. (New) A sensor as claimed in claim 31, wherein the detector has an axis and the solid angle is substantially centred on the axis.

Claim 33. (New) A sensor as claimed in claim 31, wherein the optical source has an axis and the solid angle is substantially centred on that axis.

Claim 34. (New) A sensor as claimed in claim 26, wherein at least one other portion of the chamber comprises means for admitting gas into the chamber.

Claim 35. (New) A sensor as claimed in claim 34, wherein the gas admittance means includes sintered material.

Claim 36. (New) A sensor as claimed in claim 34, wherein the gas admittance means includes a particulate filter.

Claim 37. (New) A sensor as claimed in claim 26, wherein the two reflective surfaces define foci at which the source and detector are located and a planar reflective surface defines part of the optical path between them.

Claim 38. (New) A sensor as claimed in claim 26, wherein the source is at a focus of a first part ellipsoidal surface and the detector is at a focus of a second part ellipsoidal surface and the first and second ellipsoids share a common virtual focus.

Claim 39. (New) A sensor as claimed in claim 26, wherein the source and detector are contained within a flameproof housing.

Claim 40. (New) A sensor as claimed in claim 26, wherein the housing comprises a cylinder having end walls.

Claim 41. (New) A sensor as claimed in claim 40, wherein the source and detector are mounted on a common first end wall of the housing.

Claim 42. (New) A sensor as claimed in claim 41, wherein a second end wall includes a planar reflector and gas admittance means.

Claim 43. (New) A sensor as claimed in claim 42 , wherein the planar reflector comprises a central region of the second end wall and the gas admittance means comprises a peripheral region of the second end wall.

Claim 44. (New) A sensor as claimed in claim 43, wherein the gas admittance means further includes a region of the cylinder adjacent the second end wall.

Claim 45. (New) A sensor as claimed in claim 26, wherein the optical source is an infrared source.

Claim 46. (New) A sensor as claimed in claim 26, wherein the source is arranged to heat substantially all the surfaces from which light is reflected to a temperature above ambient temperature.

Claim 47. (New) A gas sensor as claimed in claim 26, further including a reference detector located adjacent the detector so that the reference detector and the detector collect light that has traveled similar optical paths.

Claim 48. (New) A gas sensor as claim in claim 47, wherein one of the two reflective surfaces is shaped so as to form portions of a pair of overlapping part ellipsoidal surfaces, whereby light travelling form the source to the detector and reference detector travels the same optical path as far as the pair of overlapping part ellipsoidal surfaces and is split for the last portion of the distance.